



Ground-based IFF Interrogator System (GBIIS) at Edwards AFB

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14. ABSTRACT This brief presents the upcoming IFF transponder test capability at Edwards AFB known as Ground-based IFF Interrogator System (GBIIS). This brief was presented on June 5 th 2014 at the AIMS working group meeting in Virginia Beach, VA to U.S vendors, international vendors, other U.S. DoD Military Departments (aside from Air Force), and international allied partners. The overall objective of this brief was to inform the IFF transponder test communities that Edwards AFB will have a test capability in the near future to support DoD Military IFF transponder test program that need to acquire AIMS and CNS/ATM certifications. The brief agenda discusses a current IFF problem and solution, GBIIS purpose, GBIIS features, concept of operations, customer options, and current status.					
15. SUBJECT TERMS IFF (Interrogate Friend or Foe); GBIIS (Ground-based IFF Interrogator System); IOC (Initial operating Capability); FOC (Full operating Capability); AIMS (Air Traffic Control Radar Beacon System IFF Mark XII/XIIA Systems); CNS/ATM (Communications, Navigation, Surveillance/Air Traffic Management); SSR (Secondary Surveillance Radar); ADS-B (Automatic Dependent Surveillance Broadcast); TPM (Tailored Performance Matrix); TSPI (Time Space Position Information); RFA (Request for Frequency Authorization); STA (Short Term Assignment)					
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412th Test Wing



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Ground-based IFF Interrogator System (GBIIS) at Edwards AFB

June 2- 6th, 2014



U.S. AIR FORCE

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GBIIS (AN/UPX-44A)



Ground-based IFF Interrogator System



Outline



- Problem/Solution
- GBIS Purpose
- GBIS Features
- Concept of Operations
- Customer Options
- Current Status
- Contact Information
- Q&A



Problem/Solution



- Problem:
 - Every military platform with IFF transponders needs to upgrade to Mode 5 (IOC 2014 & FOC 2020).
 - No west coast Mode 5 test facility for IFF transponders.
 - UAVs need extra coordination to transport to east coast.
- Solution:
 - Edwards AFB has acquired the Ground-based IFF Interrogator System (GBIIS), a Mode 5 test facility to support IFF transponder test programs.



GBIIS Purpose



- The purpose of GBIIS is to conduct military IFF transponder flight testing and analysis in accordance with the DOD AIMS 03-1103AB for AIMS certification.
- The GBIIS also supports IFF transponder flight testing for CNS/ATM tailored performance matrices (TPM).



GBIIS Features



- Telephonics AN/UPX-44A Interrogator
 - Modes 1, 2, 3A, C, 5 L1 and L2, ADS-B OUT
 - Mode S & 4 have been disabled but will use nearby sensors to capture Mode S & 4 data
- KIV-78 Crypto Applique
- Antenna Associates FAI-54M SSR antenna
 - 5 RPM setting (12 second scan rate)
- Toughbook laptop commands the interrogator, displays the returns, and collects data
- 12-channel GPS Network Time Server that time tags the data and provides Time of Day for encryption
- UHF/VHF radios provide communication with the test aircraft



Concept of Operations



- **Aircraft will need an approved Request for Frequency Authorization (RFA) prior to testing.**
 - GBIS not involved; contact your spectrum management office early!
- **Aircraft will need to be instrumented.**
 - Independent TSPI (position truth source) needed for position, altitude and figure of merit accuracy requirements, or portions of the 03-1103 test cannot be properly verified.
 - MIL-STD-1553/ARINC 429 Bus Instrumentation needed, or certain requirements of the 03-1103 test cannot be properly verified.
 - Contact Edwards AFB early for instrumentation needs!



Concept of Operations (contd.)



- **Conduct the DoD AIMS 03-1103AB flight test at the GBIS (Edwards AFB) to collect data for AIMS certification of transponder:**
 - Use the AN/UPX-44A SSR to flight test Modes 1, 2, 3A, C, 5 L1/L2, and ADS-B OUT.
 - Use an FAA ATCBI-6 SSR to flight test Mode S ELS/EHS.
 - Coordinate with the Western Air Defense Sector to do an operational checkout of Mode 4.
 - Coordinate with FAA for additional ADS-B In and Out data, per most recent AC 20-165.
 - Send raw data and GBIS analysis to DOD AIMS Office.



Concept of Operations (contd.)



- **Projected Flight Test Timeline**
 - 2-3 Sorties (3-4 hour sorties)
 - Standard profiles approved by AIMS
- **Projected Ground Test Timeline**
 - 1-2 Days (8 hour days)



Customer Options



- GBIS can provide:
 - DoD AIMS 03-1103 and CNS/ATM TPM flight testing using GBIS and FAA radars
 - Raw data (from ground station, bus instrumentation, and TSPI)
 - Data analysis product
 - Installation of Independent TSPI if needed (with coordination from Edwards Range)
 - Installation of MIL-STD-1553/ARINC 429 Bus Instrumentation if needed (with coordination from Edwards Instrumentation)
 - Transponder ground testing if needed (with coordination from Edwards squadron)
- GBIS does not process paperwork for:
 - Request for Frequency Authorization (RFA)
 - DoD AIMS certification or CNS/ATM certification



Current Status



- In process:
 - Short term frequency assignment (STA) memo to temporarily authorize transmission on 1030MHz frequency
 - AIMS ground and flight test certification. (AIMS 03-1202 & 03-1203)
 - DD 1494 FORM Stage 3 approval



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Questions & Answers

